

*If you are using a printed copy of this procedure, and not the on-screen version, then you **MUST** make sure the dates at the bottom of the printed copy and the on-screen version match. The on-screen version of the Collider-Accelerator Department Procedure is the Official Version. Hard copies of all signed, official, C-A Operating Procedures are kept on file in the C-A ESHQ Training Office, Bldg. 911A.*

C-A OPERATIONS PROCEDURES MANUAL

ATTACHMENT

4.120.6.e 6 O'Clock (PEER 7) Mode 24 Tests

| C-A-OPM Procedures in which this Attachment is used. | | |
|--|--|--|
| 4.120.6 | | |
| | | |
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Hand Processed Changes

| <u>HPC No.</u> | <u>Date</u> | <u>Page Nos.</u> | <u>Initials</u> |
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Approved: Signature on File
 Collider-Accelerator Department Chairman _____ Date _____

V. Castillo

PASS ANNUAL ACCEPTANCE TEST PROTOCOL

Division A Software Filename and Checksum: Title: _____ Checksum: _____

Division B Software Filename and Checksum: Title: _____ Checksum: _____

Initial testing complete:

Test Team Leader’s Name (Print): _____ Life Number: _____

Test Team Leader’s Name (Sign): _____ Date: ____/____/____

Acceptance test procedure complete (following repairs and retesting if required):

Test Team Leader’s Name (Print): _____ Life Number: _____

Test Team Leader’s Name (Sign): _____ Date: ____/____/____

Test results reviewed by:

Safety Section Head’s Name (Print): _____ Life Number: _____

Safety Section Head’s Name (Sign): _____ Date: ____/____/____

Test results accepted by Radiation Safety Committee:

RSC Member’s Name (Print): _____ Life Number: _____

RSC Member’s Name (Sign): _____ Date: ____/____/____

1.1 Verify necessary conditions for Mode 24

| | | | |
|--------------------------|---|--|--------------------|
| <input type="checkbox"/> | SET | CD Key switch for | XY ARCS |
| <input type="checkbox"/> | VERIFY | CD Key switch is set for | XY ARCS |
| <input type="checkbox"/> | PLACE | Peer 7 in Mode 16 | |
| <input type="checkbox"/> | VERIFY | Peer 7 is in Controlled Access | MODE 16 |
| | CLOSE | Peer 7 gates: XGI2, YGI2 and 7GS1 | |
| | RESET | Peer 7 gates: 5GS1, 5EL1, 5GE1, 5ED1, 6GE1, 6GE2, 6MD1, 6ED1, 6GE3, 6EL1, 6ED2 | |
| <input type="checkbox"/> | VERIFY | Peer 7 gates: <input type="checkbox"/> 5GS1, <input type="checkbox"/> 5EL1, <input type="checkbox"/> 5GE1, <input type="checkbox"/> 5ED1, <input type="checkbox"/> 6GE1, <input type="checkbox"/> 6GE2, <input type="checkbox"/> 6MD1, <input type="checkbox"/> 6ED1, <input type="checkbox"/> 6GE3, <input type="checkbox"/> 6EL1, <input type="checkbox"/> 6ED2 are | RESET |
| | SWEEP | Peer 7 Zones: 5Z1, 6Z1, 6Z2 | |
| <input type="checkbox"/> | VERIFY | Peer 7 Zones: <input type="checkbox"/> 5Z1, <input type="checkbox"/> 6Z1, <input type="checkbox"/> 6Z2 are | SWEPT |
| <input type="checkbox"/> | PLACE | Peer 7 in Mode 24 | |
| <input type="checkbox"/> | VERIFY | Peer 7 is in No Access | MODE 24 |
| | RECORD | Duration [_____ secs] of Beam Imminent Alarm | |
| <input type="checkbox"/> | VERIFY | Red No Access Light at entry Gates: <input type="checkbox"/> 5GE1, <input type="checkbox"/> 6GE1, <input type="checkbox"/> 6GE2 and <input type="checkbox"/> 6GE3 is | ILLUMINATED |
| <input type="checkbox"/> | PLACE | Peer 7 in Mode 16 | |
| <input type="checkbox"/> | VERIFY | Peer 7 is in Controlled Access | MODE 16 |
| <input type="checkbox"/> | REMOVE | Reset from gate 5GE1 | |
| <input type="checkbox"/> | VERIFY | MCR sees gate 5GE1 is | NOT RESET |
| <input type="checkbox"/> | PLACE | Peer 7 in Mode 24 | |
| <input type="checkbox"/> | VERIFY | Attempt to place Peer 7 in No Access Mode | FAIL |
| | RESET | Gate 5GE1 | |
| <input type="checkbox"/> | VERIFY | MCR sees gate 5GE1 | RESET |
| | PLACE | Peer 7 in Mode 24 | |
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 in No Access | MODE 24 |
| <input type="checkbox"/> | PLACE | Peer 7 in Mode 16 | |
| <input type="checkbox"/> | VERIFY | Peer 7 is in Controlled Access | MODE 16 |
| <input type="checkbox"/> | REMOVE | Sweep from zone 5Z1 | |
| <input type="checkbox"/> | VERIFY | MCR sees zone 5Z1 is | NOT SWEPT |
| | PLACE | Peer 7 in Mode 24 | |
| <input type="checkbox"/> | VERIFY | Attempt to place Peer 7 in No Access Mode | FAIL |
| | SWEEP | Zone 5Z1 | |
| <input type="checkbox"/> | VERIFY | MCR sees zone 5Z1 | SWEPT |
| <input type="checkbox"/> | PLACE | Peer 7 in Mode 24 | |
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 in No Access | MODE 24 |
| <input type="checkbox"/> | PLACE | Peer 7 in Mode 16 | |
| <input type="checkbox"/> | VERIFY | Peer 7 is in Controlled Access | MODE 16 |
| <input type="checkbox"/> | Check for test acceptance of Verify necessary conditions for Mode 24 | | |

1.2 Verify System Response to Opening a Gate while in Mode 24

- ☐ **PLACE** Peer 5 in Mode 8
☐ **VERIFY** MCR sees Peer 5 in Restricted Access **MODE 8**

PLACE Peer 7 in Mode 24
☐ **VERIFY** MCR sees Peer 7 in No Access **MODE 24**
WAIT For **Beam Imminent Alarm** to stop sounding

SET RHIC Primary Beam Stop Withdraw command **OUT**

☐ **VERIFY** MCR sees RHIC Injection CD **DISABLED**
☐ **VERIFY** MCR sees RHIC Permit Link **ENABLED**
☐ **VERIFY** MCR sees RHIC Injection inhibit **OFF**
☐ **VERIFY** MCR sees RHIC ring inhibit **OFF**

FOLLOW Test schedule in Table 1, below

| Open gate | Verify peer 7 go to Mode 2 | Verify sweep lost | Verify RHIC ring inh ON | Verify peer 7 Permit Link is disabled | Verify RHIC Inj. Inh ON | Place peer 7 in Mode 24 & alarm stop | Set RHIC prmy BS w/draw cmd OUT | Verify RHIC ring inh ON | Verify peer 7 Permit Link is enabled | Verify RHIC Inj. Inh OFF | Goto next gate |
|-----------|----------------------------|--------------------------|--------------------------|---------------------------------------|--------------------------|--------------------------------------|---------------------------------|-------------------------|--------------------------------------|--------------------------|----------------|
| 5GE1 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | |
| 6GE1 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | |
| 6GE3 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | End of test |

Table 1- Test of Gates in Mode 24

- ☐ Check for test acceptance of System Response to Opening a Gate while in Mode 24

1.3 Verify Entry gates are securely locked in Mode 24

- ☐ **PLACE** Peer 7 in Mode 24
☐ **VERIFY** MCR sees Peer 7 in No Access **MODE 24**
WAIT For **Beam Imminent Alarm** to stop sounding

OPEN Gate 6GE3 with #14 Key and Simultaneous Release
☐ **VERIFY** Attempt to open gate 6GE3 with #14 Key and Simultaneous Release **FAIL**
OPEN Gate 6GE3 with Blue Card
☐ **VERIFY** Attempt to open gate 6GE3 with Blue Card **FAIL**

OPEN Gate YGI1 with #13 Key and Simultaneous Release
☐ **VERIFY** Attempt to open gate YGI1 with #13 Key and Simultaneous Release **FAIL**
OPEN Gate YGI1 with Blue Card
☐ **VERIFY** Attempt to open gate YGI1 with Blue Card **FAIL**

☐ Check for test acceptance of Verify entry gates are securely locked in Mode 24

1.4 Verify System Response to Pulling a Crash Cord while in Mode 24

Test in Zone 5Z1

| | | |
|--|---|-----------------|
| PLACE | Peer 7 in Mode 24 | |
| <input type="checkbox"/> VERIFY | MCR sees Peer 7 in No Access | MODE 24 |
| WAIT | For Beam Imminent Alarm to stop sounding | |
| SET | RHIC Primary Beam Stop Withdraw command | OUT |
| <input type="checkbox"/> VERIFY | MCR sees RHIC Injection CD | DISABLED |
| <input type="checkbox"/> VERIFY | MCR sees RHIC Permit Link | ENABLED |
| <input type="checkbox"/> VERIFY | MCR sees RHIC Injection inhibit | OFF |
| <input type="checkbox"/> VERIFY | MCR sees RHIC ring inhibit | OFF |
| PULL | Any Zone 5Z1 crash cord [System #: _____] | |
| <input type="checkbox"/> VERIFY | Peer 7 goes to | MODE 2 |
| <input type="checkbox"/> VERIFY | Sweep is | LOST |
| <input type="checkbox"/> VERIFY | MCR sees RHIC Injection CD | DISABLED |
| <input type="checkbox"/> VERIFY | MCR sees RHIC Permit Link | DISABLED |
| <input type="checkbox"/> VERIFY | MCR sees RHIC Injection inhibit | ON |
| <input type="checkbox"/> VERIFY | MCR sees RHIC ring inhibit | ON |
| REARM | Crash device | |
| RESET | Crash at MCR | |
| <input type="checkbox"/> VERIFY | Crash is | RESET |
| PLACE | Peer 7 in Mode 24 | |
| <input type="checkbox"/> VERIFY | Peer 7 is in Beam Imminent Mode | MODE 24 |
| PULL | Any Zone 5Z1 crash cord [System #: _____] when alarm starts sounding | |
| <input type="checkbox"/> VERIFY | Beam Imminent alarm | STOPS |
| <input type="checkbox"/> VERIFY | Peer 7 has moved to | MODE 2 |
| <input type="checkbox"/> VERIFY | MCR sees Zone 5Z1 | CRASHED |
| PLACE | Peer 7 in Mode 8 (Restricted Access) | |
| <input type="checkbox"/> VERIFY | Attempt to go to Mode 8 | FAIL |
| REARM | Crash device | |
| RESET | Crash at MCR | |
| <input type="checkbox"/> VERIFY | Crash is | RESET |
| PLACE | Peer 7 in Mode 8 | |
| <input type="checkbox"/> VERIFY | MCR sees Peer 7 in Restricted Access | MODE 8 |

Test in Zone 6Z1

| | | |
|--|---|-----------------|
| PLACE | Peer 7 in Mode 24 | |
| <input type="checkbox"/> VERIFY | MCR sees Peer 7 in No Access | MODE 24 |
| WAIT | For Beam Imminent Alarm to stop sounding | |
| SET | RHIC Primary Beam Stop Withdraw command | OUT |
| <input type="checkbox"/> VERIFY | MCR sees RHIC Injection CD | DISABLED |
| <input type="checkbox"/> VERIFY | MCR sees RHIC Permit Link | ENABLED |
| <input type="checkbox"/> VERIFY | MCR sees RHIC Injection inhibit | OFF |

| | | | |
|--------------------------|---------------|--|-----------------|
| <input type="checkbox"/> | VERIFY | MCR sees RHIC ring inhibit | OFF |
| | PULL | Any Zone 6Z1 crash cord [System #: _____] | |
| <input type="checkbox"/> | VERIFY | Peer 7 goes to | MODE 2 |
| <input type="checkbox"/> | VERIFY | Sweep is | LOST |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Injection CD | DISABLED |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Permit Link | DISABLED |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Injection inhibit | ON |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC ring inhibit | ON |
| | REARM | Crash device | |
| | RESET | Crash at MCR | |
| <input type="checkbox"/> | VERIFY | Crash is | RESET |
| | PLACE | Peer 7 in Mode 24 | |
| <input type="checkbox"/> | VERIFY | Peer 7 is in Beam Imminent Mode | MODE 24 |
| | PULL | Any Zone 6Z1 crash cord [System #: _____] when alarm starts sounding | |
| <input type="checkbox"/> | VERIFY | Beam Imminent alarm | STOPS |
| <input type="checkbox"/> | VERIFY | Peer 7 has moved to | MODE 2 |
| <input type="checkbox"/> | VERIFY | MCR sees Zone 6Z1 | CRASHED |
| | PLACE | Peer 7 in Mode 8 (Restricted Access) | |
| <input type="checkbox"/> | VERIFY | Attempt to go to Mode 8 | FAIL |
| | REARM | Crash device | |
| | RESET | Crash at MCR | |
| <input type="checkbox"/> | VERIFY | Crash is | RESET |
| | PLACE | Peer 7 in Mode 8 | |
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 in Restricted Access | MODE 8 |
| Test in Zone 6Z2 | | | |
| | PLACE | Peer 7 in Mode 24 | |
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 in No Access | MODE 24 |
| | WAIT | For Beam Imminent Alarm to stop sounding | |
| | SET | RHIC Primary Beam Stop Withdraw command | OUT |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Injection CD | DISABLED |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Permit Link | ENABLED |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Injection inhibit | OFF |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC ring inhibit | OFF |
| | PULL | Any Zone 6Z2 crash cord [System #: _____] | |
| <input type="checkbox"/> | VERIFY | Peer 7 goes to | MODE 2 |
| <input type="checkbox"/> | VERIFY | Sweep is | LOST |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Injection CD | DISABLED |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Permit Link | DISABLED |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Injection inhibit | ON |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC ring inhibit | ON |
| | REARM | Crash device | |
| | RESET | Crash at MCR | |

| | | | |
|--------------------------|---|---|-----------------|
| <input type="checkbox"/> | VERIFY | Crash is | RESET |
| | PLACE | Peer 7 in Mode 24 | |
| <input type="checkbox"/> | VERIFY | Peer 7 is in Beam Imminent Mode | MODE 24 |
| | PULL | Any Zone 6Z2 crash cord [System #: _____] when alarm starts sounding | |
| <input type="checkbox"/> | VERIFY | Beam Imminent alarm | STOPS |
| <input type="checkbox"/> | VERIFY | Peer 7 has moved to | MODE 2 |
| <input type="checkbox"/> | VERIFY | MCR sees Zone 6Z2 | CRASHED |
| | PLACE | Peer 7 in Mode 8 (Restricted Access) | |
| <input type="checkbox"/> | VERIFY | Attempt to go to Mode 8 | FAIL |
| | REARM | Crash device | |
| | RESET | Crash at MCR | |
| <input type="checkbox"/> | VERIFY | Crash is | RESET |
| | PLACE | Peer 7 in Mode 8 | |
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 in Restricted Access | MODE 8 |
| | PLACE | Peer 7 in Mode 24 | |
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 in No Access | MODE 24 |
| | WAIT | For Beam Imminent Alarm to stop sounding | |
| | SET | RHIC Primary Beam Stop Withdraw command | OUT |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Injection CD | DISABLED |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Permit Link | ENABLED |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Injection inhibit | OFF |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC ring inhibit | OFF |
| <input type="checkbox"/> | Check for test acceptance of Verify System Response to Pulling a Crash Cord while in Mode 24 | | |

1.5 Verify System Response to ODH trip while in Mode 24

| | | | |
|--------------------------|---------------|---|-----------------|
| | PLACE | Peer 7 in Mode 24 | |
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 in No Access | MODE 24 |
| | WAIT | For Beam Imminent Alarm to stop sounding | |
| | SET | RHIC Primary Beam Stop Withdraw command | OUT |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Injection CD on CD pg | DISABLED |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Permit Link | ENABLED |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Injection inhibit | OFF |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC ring inhibit | OFF |
| | TRIP | ODH sensor using test button, following Table 2 , below | |

| ODH sensor | Trip sensor | Verify peer 7 stays in Mode 24 | Verify BS withdraw cmd OUT | Verify Rhic ring inh OFF | Verify Permit link is enabled | Verify Rhic Inj. Inh OFF | Verify strobe on | Verify son-alert on | Verify fans & vents off | Go to next test |
|------------|-------------|--------------------------------|----------------------------|--------------------------|-------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-----------------|
| 5AS1/A | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 5AS1/B | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Next ODH |
| 6AS1/A | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 6AS1/B | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Next ODH |
| 6AS3/A | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 6AS3/B | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | End of test |

Table 2 – Test of ODH sensors in Mode 24

- ☐ Check for test acceptance of Verify System Response to ODH trip while in Mode 24

1.6 Test Emergency fan ON/OFF controls at 5GE1 in Mode 24

- PLACE** Peer 7 in Mode 24
☐ **VERIFY** MCR sees Peer 7 in No Access **MODE 24**
WAIT For Beam Imminent Alarm to stop sounding
- PRESS** Emergency fan ON button at gate 5GE1
WAIT For 90 sec timeout counter
- ☐ **VERIFY** Fan 5EF2 is ON
☐ **VERIFY** Fan 5EF3 is ON
☐ **VERIFY** Fan 5EF4 is ON
☐ **VERIFY** Vent 5AV1 is OPEN
☐ **VERIFY** Vent 5AV2 is OPEN
☐ **VERIFY** Vent 5AV3 is OPEN
☐ **VERIFY** Fan 4XEF2 is ON
☐ **VERIFY** Fan 4EF1 is ON
☐ **VERIFY** Fan 5EF1 is ON
☐ **VERIFY** Vent 4XAV2 is OPEN
☐ **VERIFY** Vent 4XAV3 is OPEN
☐ **VERIFY** Vent 4AV1 is OPEN
- PRESS** Emergency fan OFF button at gate 5GE1
WAIT For 90 sec timeout counter
- ☐ **VERIFY** Fan 5EF2 is OFF
☐ **VERIFY** Fan 5EF3 is OFF
☐ **VERIFY** Fan 5EF4 is OFF
☐ **VERIFY** Vent 5AV1 is CLOSED
☐ **VERIFY** Vent 5AV2 is CLOSED
☐ **VERIFY** Vent 5AV3 is CLOSED
☐ **VERIFY** Fan 4XEF2 is OFF
☐ **VERIFY** Fan 4EF1 is OFF

- | | | | |
|--------------------------|---------------|----------------------|---------------|
| <input type="checkbox"/> | VERIFY | Fan 5EF1 is | OFF |
| <input type="checkbox"/> | VERIFY | Vent 4XAV2 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 4XAV3 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 4AV1 is | CLOSED |

- ☐ Check for test acceptance of Emergency fan ON/OFF controls at 5GE1 in Mode 24

1.7 Test MCR reset of Emergency ON/OFF at 5GE1 in Mode 24

- | | | | |
|--------------------------|---------------|---|----------------|
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 in No Access | MODE 24 |
|--------------------------|---------------|---|----------------|

PRESS Emergency fan **ON** button at gate **5GE1**
WAIT For **90 sec** timeout counter

- | | | | |
|--------------------------|---------------|----------------------|-------------|
| <input type="checkbox"/> | VERIFY | Fan 5EF2 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 5EF3 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 5EF4 is | ON |
| <input type="checkbox"/> | VERIFY | Vent 5AV1 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 5AV2 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 5AV3 is | OPEN |
| <input type="checkbox"/> | VERIFY | Fan 4XEF2 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 4EF1 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 5EF1 is | ON |
| <input type="checkbox"/> | VERIFY | Vent 4XAV2 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 4XAV3 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 4AV1 is | OPEN |

PRESS Emergency fan **OFF** button at **MCR**
WAIT For **90 sec** timeout counter

- | | | | |
|--------------------------|---------------|----------------------|---------------|
| <input type="checkbox"/> | VERIFY | Fan 5EF2 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 5EF3 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 5EF4 is | OFF |
| <input type="checkbox"/> | VERIFY | Vent 5AV1 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 5AV2 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 5AV3 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Fan 4XEF2 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 4EF1 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 5EF1 is | OFF |
| <input type="checkbox"/> | VERIFY | Vent 4XAV2 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 4XAV3 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 4AV1 is | CLOSED |

- ☐ Check for acceptance of Test MCR reset of Emergency ON/OFF at 5GE1 in Mode 24

1.8 Test Emergency fan ON/OFF at 6GE1 Mode 24

- | | | | |
|--------------------------|--|---|----------------|
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 in No Access | MODE 24 |
| | PRESS | Emergency fan ON button at gate 5GE1 | |
| | WAIT | For 90 sec timeout counter | |
| <input type="checkbox"/> | VERIFY | Fan 6XEF1 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 6XEF2 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 6XAV1 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 6XAV2 is | OPEN |
| | PRESS | Emergency fan OFF button at gate 5GE1 | |
| | WAIT | For 90 sec timeout counter | |
| <input type="checkbox"/> | VERIFY | Fan 6XEF1 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 6XEF2 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 6XAV1 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 6XAV2 is | CLOSED |
| <input type="checkbox"/> | Check for acceptance of Test Emergency fan ON/OFF at 6GE1 Mode 24 | | |

1.9 Test MCR reset of Emergency ON/OFF at 6GE1 Mode 24

- | | | | |
|--------------------------|---|--|----------------|
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 in No Access | MODE 24 |
| | PRESS | Emergency fan ON button at gate 5GE1 | |
| | WAIT | For 90 sec timeout counter | |
| <input type="checkbox"/> | VERIFY | Fan 6XEF1 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 6XEF2 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 6XAV1 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 6XAV2 is | OPEN |
| | PRESS | Emergency fan OFF button at MCR | |
| | WAIT | For 90 sec timeout counter | |
| <input type="checkbox"/> | VERIFY | Fan 6XEF1 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 6XEF2 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 6XAV1 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 6XAV2 is | CLOSED |
| <input type="checkbox"/> | Check for test acceptance of MCR reset of Emergency ON/OFF at 6GE1 Mode 24 | | |

1.10 Test Emergency fan ON/OFF at gate 6GE3 Mode 24

- | | | | |
|--------------------------|---|---|----------------|
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 in No Access | MODE 24 |
| | PRESS | Emergency fan ON button at gate 6GE3 | |
| | WAIT | For 90 sec timeout counter | |
| <input type="checkbox"/> | VERIFY | Fan 6EF1 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 6EF2 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 6EF3 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 7EF1 is | ON |
| <input type="checkbox"/> | VERIFY | Vent 6AV1 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 6AV2 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 6AV3 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 7AV1 is | OPEN |
| <input type="checkbox"/> | VERIFY | Fan 7EF2 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 7EF3 is | ON |
| <input type="checkbox"/> | VERIFY | Vent 7AV2 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 7AV3 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 7AV4 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 7AV5 is | OPEN |
| | PRESS | Emergency fan OFF button at gate 6GE3 | |
| | WAIT | For 90 sec timeout counter | |
| <input type="checkbox"/> | VERIFY | Fan 6EF1 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 6EF2 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 6EF3 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 7EF1 is | OFF |
| <input type="checkbox"/> | VERIFY | Vent 6AV1 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 6AV2 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 6AV3 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 7AV1 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Fan 7EF2 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 7EF3 is | OFF |
| <input type="checkbox"/> | VERIFY | Vent 7AV2 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 7AV3 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 7AV4 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 7AV5 is | CLOSED |
| <input type="checkbox"/> | Check for test acceptance of Emergency fan ON/OFF at gate 6GE3 Mode 24 | | |

1.11 Test MCR reset of Emergency fan ON/OFF at gate 6GE3 Mode 24

- | | | | |
|--------------------------|--|--|----------------|
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 in No Access | MODE 24 |
| | PRESS | Emergency fan ON button at gate 6GE3 | |
| | WAIT | For 90 sec timeout counter | |
| <input type="checkbox"/> | VERIFY | Fan 6EF1 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 6EF2 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 6EF3 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 7EF1 is | ON |
| <input type="checkbox"/> | VERIFY | Vent 6AV1 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 6AV2 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 6AV3 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 7AV1 is | OPEN |
| <input type="checkbox"/> | VERIFY | Fan 7EF2 is | ON |
| <input type="checkbox"/> | VERIFY | Fan 7EF3 is | ON |
| <input type="checkbox"/> | VERIFY | Vent 7AV2 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 7AV3 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 7AV4 is | OPEN |
| <input type="checkbox"/> | VERIFY | Vent 7AV5 is | OPEN |
| | PRESS | Emergency fan OFF button at MCR | |
| | WAIT | For 90 sec timeout counter | |
| <input type="checkbox"/> | VERIFY | Fan 6EF1 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 6EF2 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 6EF3 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 7EF1 is | OFF |
| <input type="checkbox"/> | VERIFY | Vent 6AV1 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 6AV2 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 6AV3 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 7AV1 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Fan 7EF2 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan 7EF3 is | OFF |
| <input type="checkbox"/> | VERIFY | Vent 7AV2 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 7AV3 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 7AV4 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent 7AV5 is | CLOSED |
| <input type="checkbox"/> | Check for test acceptance of MCR reset of Emergency fan ON/OFF at gate 6GE3 Mode 24 | | |

1.12 Test local fan controls in service building 1006B Mode 24

- | | | | |
|--------------------------|--|--|----------------|
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 in No Access | MODE 24 |
| | PRESS | Fan ON button at fan box | |
| <input type="checkbox"/> | VERIFY | 1006B fan is | ON |
| <input type="checkbox"/> | VERIFY | 1006B vent is | OPENED |
| | TURN OFF | 1006B fan using MCR Fan OFF button | |
| <input type="checkbox"/> | VERIFY | Attempt to turn off 1006B fan using MCR Fan OFF button | FAIL |
| | PRESS | Fan OFF button at fan box | |
| <input type="checkbox"/> | VERIFY | 1006B fan is | OFF |
| <input type="checkbox"/> | VERIFY | 1006B vent is | CLOSED |
| <input type="checkbox"/> | Check for test acceptance of local fan controls in service building 1006B Mode 24 | | |

1.13 Test Division A loss of Remote I/O in Mode 24

- | | | | |
|--------------------------|--|--|------------------|
| <input type="checkbox"/> | VERIFY | CD Key switch is set for | XY ARCS |
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 in No Access | MODE 24 |
| | SET | RHIC Primary Beam Stop Withdraw command | OUT |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Injection CD on CD pg | DISABLED |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Permit Link | ENABLED |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Injection inhibit | OFF |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC ring inhibit | OFF |
| | UNPLUG | Remote I/O cable from Scanner module in Peer 7A | |
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 Div A CD RIO on H/W pg | FAULT |
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 Div A go to | MODE 2 |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Injection CD on CD pg | DISABLED |
| <input type="checkbox"/> | VERIFY | MCR sees Div A RHIC Permit Link | DISABLED |
| <input type="checkbox"/> | VERIFY | MCR sees Div A RHIC Injection inhibit | ON |
| <input type="checkbox"/> | VERIFY | MCR sees Div A RHIC ring inhibit | ON |
| <input type="checkbox"/> | VERIFY | MCR sees Div A RHIC Injn rhbk latch | ON |
| <input type="checkbox"/> | VERIFY | MCR sees Div A RHIC rhbk latch | ON |
| <input type="checkbox"/> | VERIFY | MCR sees on CD pg W | REACHBACK |
| <input type="checkbox"/> | VERIFY | MCR sees on CD pg RHIC | REACHBACK |
| <input type="checkbox"/> | VERIFY | MCR sees on CD pg BS G3 | IN |
| | REPLACE | Remote I/O cable at Scanner module in Peer 7A | |
| | RESET | NG CRIT I/O condition at MCR | |
| <input type="checkbox"/> | VERIFY | MCR sees CD RIO | OK |
| | PLACE | Peer 7 in Mode 2 | |
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 in Safe Access | MODE 2 |
| | PLACE | Peer 7 in Mode 16 | |
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 in Controlled Access | MODE 16 |
| <input type="checkbox"/> | Check for test acceptance of Division A loss of Remote I/O in Mode 24 | | |

1.14 Test Division B loss of Remote I/O in Mode 24

- | | | | |
|--------------------------|--|---|------------------|
| <input type="checkbox"/> | VERIFY | CD Key switch is set for | XY ARCS |
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 Div B still in No Access | MODE 24 |
| | SET | RHIC Primary Beam Stop Withdraw command | OUT |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Injection CD on CD pg | DISABLED |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Permit Link | ENABLED |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Injection inhibit | OFF |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC ring inhibit | OFF |
| | UNPLUG | Remote I/O cable from Scanner module in Peer 7B | |
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 Div B CD RIO on H/W pg | FAULT |
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 Div B go to | MODE 2 |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Injection CD on CD pg | DISABLED |
| <input type="checkbox"/> | VERIFY | MCR sees Div B RHIC Permit Link | DISABLED |
| <input type="checkbox"/> | VERIFY | MCR sees Div B RHIC Injection inhibit | ON |
| <input type="checkbox"/> | VERIFY | MCR sees Div B RHIC ring inhibit | ON |
| <input type="checkbox"/> | VERIFY | MCR sees Div B RHIC Injn rhbk latch | ON |
| <input type="checkbox"/> | VERIFY | MCR sees Div B RHIC rhbk latch | ON |
| <input type="checkbox"/> | VERIFY | MCR sees on CD pg W | REACHBACK |
| <input type="checkbox"/> | VERIFY | MCR sees on CD pg RHIC | REACHBACK |
| <input type="checkbox"/> | VERIFY | MCR sees on CD pg BS G3 | IN |
| | REPLACE | Remote I/O cable at Scanner module in Peer 7B | |
| | RESET | NG CRIT I/O condition at MCR | |
| <input type="checkbox"/> | VERIFY | MCR sees CD RIO | OK |
| | PLACE | Peer 7 in Mode 2 | |
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 in Safe Access | MODE 2 |
| | PLACE | Peer 7 in Mode 16 | |
| <input type="checkbox"/> | VERIFY | MCR sees Peer 7 in Controlled Access | MODE 16 |
| <input type="checkbox"/> | Check for test acceptance of Division B loss of Remote I/O in Mode 24 | | |

1.15 Sweep tests in Mode 24

- | | | | |
|--------------------------|---------------|---|----------------|
| | RESET | Peer 7 gates: 5GS1, 5EL1, 5GE1, 5ED1, 6GE1, 6GE2, 6MD1, 6ED1, 6GE3, 6EL1, 6ED2 | |
| <input type="checkbox"/> | VERIFY | Peer 7 gates: <input type="checkbox"/> 5GS1, <input type="checkbox"/> 5EL1, <input type="checkbox"/> 5GE1, <input type="checkbox"/> 5ED1, <input type="checkbox"/> 6GE1, <input type="checkbox"/> 6GE2, <input type="checkbox"/> 6MD1, <input type="checkbox"/> 6ED1, <input type="checkbox"/> 6GE3, <input type="checkbox"/> 6EL1, <input type="checkbox"/> 6ED2 are | RESET |
| | SWEEP | Peer 7 Zones: 5Z1, 6Z1, 6Z2 | |
| <input type="checkbox"/> | VERIFY | Peer 7 Zones: <input type="checkbox"/> 5Z1, <input type="checkbox"/> 6Z1, <input type="checkbox"/> 6Z2 are | SWEPT |
| | PLACE | Peer 7 in Mode 24 | |
| <input type="checkbox"/> | VERIFY | Peer 7 is in No Access | MODE 24 |
| | PLACE | Peer 7 in Mode 16 | |
| <input type="checkbox"/> | VERIFY | Peer 7 is in Controlled Access | MODE 16 |
| | FOLLOW | Test Schedule in Table 3, below | |

| Zone | Gate | Open gate w/o SR | Verify sweep lost | Verify cannot sweep with gate open | Close gate | Force sweep | Verify cannot go to Mode 24 | Reset gate | Verify can go to Mode 24 | Go to Mode 16 & next gate |
|------|------|------------------|--------------------------|------------------------------------|------------|-------------|-----------------------------|------------|--------------------------|---------------------------|
| 5Z1 | 5GE1 | | <input type="checkbox"/> | <input type="checkbox"/> | | | <input type="checkbox"/> | | <input type="checkbox"/> | |
| 5Z1 | YGI2 | | <input type="checkbox"/> | <input type="checkbox"/> | | | N/A | N/A | <input type="checkbox"/> | |
| 6Z1 | 6GE1 | | <input type="checkbox"/> | <input type="checkbox"/> | | | <input type="checkbox"/> | | <input type="checkbox"/> | |
| 6Z1 | 6MD1 | | <input type="checkbox"/> | <input type="checkbox"/> | | N/A | <input type="checkbox"/> | | <input type="checkbox"/> | |
| 6Z2 | 6GE3 | | <input type="checkbox"/> | <input type="checkbox"/> | | | <input type="checkbox"/> | | <input type="checkbox"/> | |
| 6Z2 | 7GS1 | | <input type="checkbox"/> | <input type="checkbox"/> | | | N/A | N/A | N/A | N/A |

Table 3 – Sweep tests in Mode 24

- ☐ Check for test acceptance of Sweep tests in Mode 24

1.16 Chipmunk Tests in Mode 24

- ATTACH Test Box to Chipmunk prior to test
PLACE Peer 7 in Mode 24
- ☐ VERIFY MCR sees Peer 7 in No Access MODE 24
WAIT For Beam Imminent Alarm to stop sounding
- SET RHIC Primary Beam Stop Withdraw command OUT
- ☐ VERIFY MCR sees RHIC Injection CD DISABLED
☐ VERIFY MCR sees RHIC Permit Link ENABLED
☐ VERIFY MCR sees RHIC Injection inhibit OFF
☐ VERIFY MCR sees RHIC ring inhibit OFF

| C'munk | Press & verify div A trip | Verify peer 7 stays in mode 24 | Verify div A Rhic ring inh ON | Verify div A Rhic permit link disabled | Verify div A Rhic Inj. Inh ON | Reset all Systems & cycle BS cmd to OUT | Verify div A Rhic ring inh OFF | Verify div A Rhic permit link enabled | Verify div A Rhic Inj. Inh OFF | Goto table 5 for div B trip |
|--------|---------------------------|--------------------------------|-------------------------------|--|-------------------------------|---|--------------------------------|---------------------------------------|--------------------------------|-----------------------------|
| C33 | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| C36 | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |

Table 4 – Division A trip test in Mode 24

| C'munk | Press & verify div B trip | Verify peer 7 stays in mode 24 | Verify div B Rhic ring inh ON | Verify div B Rhic permit link disabled | Verify div B Rhic Inj. Inh ON | Reset all Systems & cycle BS cmd to OUT | Verify div A & B Rhic ring inh OFF | Verify div A & B Rhic permit link enabled | Verify div A & B Rhic Inj. inh OFF | Goto table 6 for div A fails |
|---------------|--------------------------------------|---------------------------------------|--------------------------------------|---|--------------------------------------|--|---|--|---|-------------------------------------|
| C33 | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| C36 | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |

Table 5 – Division B Trip test in Mode 24

| C'munk | Press & verify div A fails | Verify peer 7 divA goes to mode 2 | Verify div A Rhic ring inh ON | Verify div A Rhic permit link disabled | Verify div A Rhic Inj. Inh ON | Reset all systms & place peer 7 div A & B in Mode 2 | Place peer 7 in mode 24 & alarm stop | Verify pmry BS with-draw cmd is OUT | Verify div A & B Rhic ring inh OFF | Verify div A & B Rhic permit link enabled | Verify div A & B Rhic Inj. Inh OFF | Go to table 7 for div B fails |
|---------------|---------------------------------------|--|--------------------------------------|---|--------------------------------------|--|---|--|---|--|---|--------------------------------------|
| C33 | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| C36 | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |

Table 6 – Division A Fails test in Mode 24

| C'munk | Press & verify div B fails | Verify peer 7 divB goes to mode 2 | Verify div B Rhic ring inh ON | Verify div B Rhic permit link disabled | Verify div B Rhic Inj. Inh ON | Reset all systms & place peer 7 div A & B in Mode 2 | Place peer 7 in mode 24 & alarm stop | Verify pmry BS with-draw cmd is OUT | Verify div A & B Rhic ring inh OFF | Verify div A & B Rhic permit link enabled | Verify div A & B Rhic Inj. Inh OFF | See end of test instrns below |
|---------------|---------------------------------------|--|--------------------------------------|---|--------------------------------------|--|---|--|---|--|---|--------------------------------------|
| C33 | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| C36 | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |

Table 7 – Division B Fails test in Mode 24

End of Test Instructions:

- | | | |
|--|--|-----------|
| DETACH | Test Box from Chipmunk after test | |
| CONNECT | Cable to Chipmunk | |
| RESET | Chipmunk faults at MCR | |
| <input type="checkbox"/> VERIFY | MCR sees Chipmunk | OK |
| | | |
| ATTACH | Test Box to next Chipmunk for test / or end Chipmunk test | |
| START | Test sequence at Table 4 | |
| <input type="checkbox"/> | Check for acceptance of Chipmunk Tests in Mode 24 | |

END OF TEST PROCEDURE

TTL: Sign for completion of initial testing: _____

Date: ____/____/____

TTL: Sign for completion of final testing: _____

Date: ____/____/____